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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/911,047	07/23/2001	Glen H. Erikson	E1047/20060	3230

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EXAMINER	
FORMAN, BETTY J	

ART UNIT	PAPER NUMBER
1634	

DATE MAILED: 05/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/911,047	ERIKSON ET AL.	
	Examiner	Art Unit	
	BJ Forman	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-9 and 12-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 6-9 12-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☑ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4 April 2006 has been entered.

Status of the Claims

2. This action is in response to papers filed 4 April 2006 in which the previous rejections were traversed. No amendments have been filed.

The previous rejections in the Office Action dated 4 November 2004 under 35 U.S.C. 112, first paragraph, not reiterated below, are withdrawn in view of Applicant's comments on page 2 of the response. The previous rejections under 35 U.S.C103(a) are withdrawn in view of further consideration of the art and new grounds for rejection. Applicant's arguments have been thoroughly reviewed and are discussed below as they apply to the instant grounds for rejection. New grounds for rejection are discussed.

Claims 1-4, 6-9, 12-37 are under prosecution.

Specification

3. The disclosure is objected to because essential subject matter is incorporated by reference. Essential subject matter as defined by C.F.R. 1.57(b-g) must be added to the specification to provide proper written description of the claimed invention.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

35 U.S.C. 112: first paragraph

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 34 and 36 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 34 and 36 define a time period for voltage application i.e. "15 seconds or less".

Response to Arguments

6. Applicant points to Example 1, page 16, lines 16-18 and Example 4, page 23, lines 24-26 for support of the newly claimed time period. The cited passages defines a time period of 15 and 11 seconds. However, the claimed "15 seconds or less" encompasses a range of time periods of 0 to 15 seconds. Neither the cited passages nor the entire specification teach the claimed range or define the process for determining what portion less than 15 seconds would function adequately within the method. Therefore, the specification does not advise one of skill in the art the meets and bounds of the newly claimed method.

35 U.S.C. 112: second paragraph

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-4, 6-9, 12-26 and 30-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-4, 6-9, 12-26 and 30-35 are indefinite in Claim 1, step (e) because the claim is drawn to a property of the probe i.e. the probe hybridizes specifically with a target to form.....quadraplex". However, the claim does not detect recite a method step of hybridization or duplex, triplex, quadraplex detection. Therefore it is unclear whether the method requires duplex, triplex or quadraplex formation and/or detection.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 27-29 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Meade et al (U.S. Patent No. 5,770,369, issued 23 June 1998).

Regarding Claim 27, Meade et al disclose a method comprising adding probe and target sequences, applying a first stimulus (photoinduced electron transfer using electromagnetic radiation, Column 24, lines 21-25), detecting a first signal (fluorescence), applying a second stimulus (photoinduced electron transfer) and detecting a second signal (fluorescence) and comparing first and second signal to accomplish assay (Example 7). Meade teaches the probe-target assay (Example 7) wherein the stimulus is photoactivated electron transfer via laser excitation (Column 34, lines 22-24 and Column 33, lines 14-19) and they define the photoactivation as "electromagnetic radiation" (Column 24, lines 21-25). Furthermore, they

teach the stimuli is "light plus electronic initiation" (Column 24, Table 2). Because they teach photoactivation is electronic radiation and because they teach activation is "light plus electronic", they provide both photonic and electronic stimuli as claimed.
Meade also teaches photoactivation wherein data is acquired at several wavelengths (Column 33, lines 14-19) thereby providing the claimed first and second stimulus.

Regarding Claim 28, Meade et al disclose the method wherein the probe is a peptide (PNA, Column 6, lines 59-67).

Regarding Claim 29, Meade et al disclose the method wherein the probe is not a biopolymer (i.e. PNA, Column 6, lines 59-67).

Regarding Claim 37, Meade et al disclose the method wherein the stimulus is sufficient to destabilize mismatched hybrids (melt) under conditions that do not destabilize perfectly matched hybrids (i.e. melting curve analysis of Example 5).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1-4, 6-9, 12-26 and 30-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meade et al (U.S. Patent No. 6,071,699, issued 6 June 2000) in view of Fresco et al (U.S. Patent No. 6,426,407, filed 7 June 1995) or Cummins et al (U.S. Patent No. 5,874,213, issued 23 February 1999).

Regarding Claim 1, Meade et al disclose a method comprising adding probe and target sequences, applying a first stimulus (photoinduced electron transfer using electromagnetic radiation, Column 24, lines 21-25), detecting a first signal (fluorescence), applying a second stimulus (photoinduced electron transfer) and detecting a second signal (fluorescence) and comparing first and second signal to accomplish assay (Example 7). Meade teaches the probe-target assay (Example 7) wherein the stimulus is photoactivated electron transfer via laser excitation (Column 34, lines 22-24 and Column 33, lines 14-19) and they define the photoactivation as "electromagnetic radiation" (Column 24, lines 21-25). Furthermore, they teach the stimuli is "light plus electronic initiation" (Column 24, Table 2). Because they teach photoactivation is electronic radiation and because they teach activation is "light plus electronic", they provide both photonic and electronic stimuli as claimed.
Meade also teaches photoactivation wherein data is acquired at several wavelengths (Column 33, lines 14-19) thereby providing the claimed first and second stimulus.

Furthermore, Meade teaches that triplex DNA is of interest in the art (Column 2, line 67) but they do not specifically teach the method wherein the probe hybridizes to form a triplex.

However, triplex forming probes were well known in the art at the time the claimed invention was made as taught by Fresco et al (Abstract). Fresco et al teach triplex having holomologous duplex (third strand conformation e.g. A-A, Table 1) Watson-Crick triplex (e.g. A-T-A; C-G-C, Column 1, lines 20-39 and Table 2) and a Watson-Crick triplex (e.g. target strand binds Watson-Crick with third strand binding via hydrogen bonding in a sequence-specific manner in parallel or anti-parallel conformation, Column 9, lines 25-50 and Column 21, lines 17-54). Fresco et al further teach their probes provide a "quantum leap" in binding control and are useful for binding all duplexes for their isolation and/or identification in diagnosis and research (Column 30, lines 19-43).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the triplex of Fesco et al to the target detection of Meade et al. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success and for the expected benefit of improved binding control useful in the isolation and identification of diagnostic and research applications as taught by Fesco et al (Column 30, lines 19-43).

Cummings et al also teach triplex or quadraplex formation in target detection (Column 8, lines 40-48), their advantage being that the triplex or quadraplex formed between the probe and target provide different charge-to-mass ratio and different melting properties from non-complexed targets thereby facilitating their detection (Column 8, lines 35-60). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the triplex or quadraplex of Cummings et al to the target detection of Meade et al. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success and for the expected benefit of improved detection of the complexed target at taught by Cummings et al (Column 8, lines 35-60).

Regarding Claim 2-4 and 6-9, Meade teaches the probe-target assay (Example 7) wherein the stimulus is photoactivated electron transfer via laser excitation (Column 34, lines 22-24 and Column 33, lines 14-19) and they define the photoactivation as "electromagnetic radiation" (Column 24, lines 21-25). Furthermore, they teach a preferred stimulus is "light plus electronic initiation" (Column 24, Table 2). Therefore, each stimulus is both light (photonic) plus electronic. Because they teach photoactivation is electromagnetic radiation and because they teach that preferred activation is "light plus electronic", they provide both photonic and electronic stimuli at each stimulus. Meade also teaches photoactivation wherein data is acquired at several wavelengths (Column 33, lines 14-19) thereby providing the claimed first and second stimulus. Because they teach multiple stimuli and because they teach that

each stimulus is photonic plus electronic, they teach all the combination of photonic and electronic stimuli as claimed.

Regarding Claim 12, Meade et al disclose the method wherein the light stimulus is via laser (Column 24, lines 55-60).

Regarding Claim 13, Meade et al disclose the method wherein electronic stimulus is via voltage (Column 24, lines 61-62).

Regarding Claim 14, Meade et al disclose the method wherein at least one label transfers energy to at least on other label to generate the signal i.e. electron transfer (Abstract).

Regarding Claim 15, Meade et al disclose the method wherein the label is chemi- or electrochemiluminescent (e.g. Column 26, lines 62-65 and Table 2)

Regarding Claim 16, Meade et al disclose the method wherein the label is electron spin (Table 2).

Regarding Claims 17-19, Fresco et al teach triplex having holomologous duplex (third strand conformation e.g. A-A, Table 1) Watson-Crick triplex (e.g. A-T-A; C-G-C, Column 1, lines 20-39 and Table 2) and a Watson-Crick triplex (e.g. target strand binds Watson-Crick with third strand binding via hydrogen bonding in a sequence-specific manner in parallel or anti-parallel conformation, Column 9, lines 25-50 and Column 21, lines 17-54). Fresco et al does not teach the complexes have Hoogsteen bonds. Hence, the complexes deemed to be "substantially free" of Hoogsteen bonds.

Additionally, Cummins et al disclose the method wherein the target and probe form a homologous duplex (Column 8, lines 35-59) or a DNA/oligomer triplex (Column 8, line 47) or higher order e.g. tetraplex (Column 8, line 48). Cummins et al teach binding between complementary sequences and therefore are deemed to be "substantially free" of Hoogsteen bonding.

Regarding Claim 20, Meade et al disclose the method wherein the probe has an uncharged backbone (PNA) or nucleobase analog (Column 6, lines 34-67).

Regarding Claim 21, Meade et al disclose the method wherein the probe contains an amino acid sequence (PNA, Column 6, lines 59-67).

Regarding Claim 22, Meade et al disclose the method wherein at least one additional signal is applied, detected and compared i.e. data is acquired at several different wavelengths (Column 33, lines 14-18 and column 34, line 24).

Regarding Claim 23, Meade et al disclose the method wherein the stimuli are different (i.e. several different wavelengths (Column 33, lines 14-18 and column 34, line 24).

Regarding Claim 24, Meade et al disclose the method of Claim 22 wherein the stimuli are applied non-continuously (e.g. pulsed, Column 25, lines 42-54).

Regarding Claim 25, Meade et al disclose the method of Claim 1 wherein the stimuli are applied non-continuously (e.g. pulsed, Column 25, lines 42-54).

Regarding Claim 26, Meade et al disclose the method wherein the probe or target is bonded to a substrate or electrode (Fig. 8, Column 6, lines 25-30).

Regarding Claim 30, Meade et al disclose the method wherein the label is not covalently bound to the probe or target (i.e. the label is an electrode to which the nucleic acid is other-than covalently bound (Column 8, lines 48-51).

Regarding Claims 31-32, Meade et al do not teach the label is an intercalator However, Fresco et al teach the similar assay wherein triplex complexes are labeled with intercalators so as not to interfere with third strand binding or specificity (Column 29, line 61-Column 30, line4). And, Cummins et al disclose a similar triplex assay using a wherein the label is an intercalating agent wherein the intercalating agent is not covalently bound to the probe or target (Column 9, lines 28-30).

Regarding Claim 33, Meade et al disclose the method wherein the stimuli are directly applied to the sample (e.g. via direct linkage of the nucleic acid to the electrode, Column 24, lines 61-67).

Regarding Claim 34, Meade et al disclose the method wherein the voltage is applied and detected using pulse methods (Column 25, lines 42-54 and Column 27, lines 3-19) and they further teach that the voltage is optimized based on the sample (Column 27, lines 39-48)but they are silent regarding the time period of the pulse. However, It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to derive the optimal pulse time based on the suggestion of Meade et al to do so.

It is noted that *In re Aller*, 220 F.2d 454,456, 105 USPQ 233,235 states where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum by routine experimentation.

Regarding Claim 35, Meade et al disclose the method wherein the stimulus is sufficient to destabilize mismatched hybrids (melt) under conditions that do not destabilize perfectly matched hybrids (e.g. melting curve analysis of Example 5).

13. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meade et al (U.S. Patent No. 6,071,699, issued 6 June 2000)

Regarding Claim 36, Meade et al disclose a method comprising adding probe and target sequences, applying a first stimulus (photoinduced electron transfer using electromagnetic radiation, Column 24, lines 21-25), detecting a first signal (fluorescence), applying a second stimulus (photoinduced electron transfer) and detecting a second signal (fluorescence) and comparing first and second signal to accomplish assay (Example 7). Meade teaches the probe-target assay (Example 7) wherein the stimulus is photoactivated electron transfer via laser excitation (Column 34, lines 22-24 and Column 33, lines 14-19) and they define the photoactivation as "electromagnetic radiation" (Column 24, lines 21-25). Furthermore, they teach the stimuli is "light plus electronic initiation" (Column 24, Table 2). Because they teach

photoactivation is electronic radiation and because they teach activation is "light plus electronic", they provide both photonic and electronic stimuli as claimed.
Meade also teaches photoactivation wherein data is acquired at several wavelengths (Column 33, lines 14-19) thereby providing the claimed first and second stimulus.

Meade et al also teach that the voltage is applied and detected using pulse methods (Column 25, lines 42-54 and Column 27, lines 3-19) and they further teach that the voltage is optimized based on the sample (Column 27, lines 39-48)but they are silent regarding the time period of the pulse. However, It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to derive the optimal pulse time based on the suggestion of Meade et al to do so.

Conclusion

14. No claim is allowed.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

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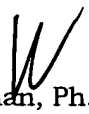

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Primary Examiner
Art Unit: 1634
May 11, 2006